

REMARKS

Claims 1, 3-24, 26, 27 and 29-34 are pending. By this response claims 1, 4-5, 6, 18, 20, 21, 27, and 30-32 have been amended and claims 2-3, 19, 24-26, 28, 29, and 34 have been canceled without prejudice to or disclaimer of the subject matter recited therein. Reconsideration and allowance are respectfully requested.

Claims 1, 3, 5-6, 16-19, 21-24, 27, 29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Biles in view of Yeh et al. (U.S. Pub. No. 2001/0047467).

Claims 4, 20 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eiles and Yeh in view of McFarling (U.S. Pat. No. 6,374,349).

Claims 7-15, 26 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Biles/Yeh (with use of Official Notice).

Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Biles/Yeh/McFarling in view of Talcott (U.S. Pat. No. 6,272,623).

Claim 1 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Biles in view of Yeh-2 (Alternative Implementation of Two-Level Adaptive Branch Prediction).

Applicants note that a copy of the Notice of References cited by the Examiner was not included in the final rejection, and the newly cited art, including Talcott and Yeh-2, among others, were not enclosed with the Final Rejection. Applicants retrieved Yeh, et al., "Alternative Implementations of Two-Level Adaptive Branch Prediction, presented at the 19th Symposium on Computer Architecture, pp. 124-134, May 19-21, 1992, Gold Coast, Australia, although we note that the complete citation is not officially recorded, as the Official Action only recites the title, without citation.

Claim 34 rejected under § 103 combination of Biles & Yeh & McFarling & Talcott

As the Official Action made the rejections final, Applicants respond to the newly presented art, Talcott, combined with other prior art rejecting claim 34, which is the only pending rejection of claim 34. Applicants have amended claim 1 to incorporate the recitations of dependent claims 3 and 34, as the prior art fails to teach or suggest the claimed approach. Claim 34 was rejected as an obvious combination of Biles (U.S. Pub. No. 2004/0210749); Yeh et al. (U.S. Pub. No. 2001/0047467); McFarling (U.S. Patent No 6,374,349) and Talcott (U.S. Pat. no. 6,272,623). Applicants traverse these

rejections and respectfully assert that the cited references fail to teach or suggest all of the claimed limitations.

As required by MPEP § 2143, a prima facie rejection of obviousness requires that “the prior art reference (or references when combined) must teach or suggest all the claim limitations.” The Examiner has not cited any art that describes a folding operation to reduce the size of an index, as required by amended claim 1. Nor has the Examiner stated any reasoning that would make obvious to one of ordinary skill in the art to employ a folding operation to reduce the size of an index.

The Examiner correctly notes that the previously cited prior art fails to disclose “folding a second index to obtain a smaller index for use in indexing into the second global array.” The Examiner then notes that Talcott (U.S. Patent 6,272,623) “discloses two branch history tables, including a smaller table with a folded index (col. 3, line 32-60).” This is incorrect.

Talcott discloses a global history register (240) and a local history table (220). Applicants understand the Examiner is pointing to col. 3, line 54, where “1 bits [sic] from the local history table” is concatenated with the global history table. This one bit from the local history table is not a folded index. Rather, the one bit is a truncated instruction address as described at col. 4, lines 54-65:

The process begins with IFU 290 reading local history table 220 (step 410).

Specifically, IFU uses bits a+1:2 of the instruction address to access local history data from local history table 220. As used herein, the terminology

“m:n” denotes bits m through n, inclusive. In a preferred embodiment,

these bits correspond to the [sic] a least significant bits of the instruction address excluding the last two bits. ... By accessing local history table 220,

IFU 290 causes it to generate an output that is at least 1 bits wide.

The use of the least significant bits is a truncation operation not a fold, as claimed in amended claim 1.

As is recognized by one of ordinary skill in the art, a fold can be a known hashing function. For example, *McGraw Hill Dictionary of Scientific and Technical Terms*, 5th Ed., 1994, defines “Folding” as “hashing which consists of splitting the original key into two or more parts then adding the parts together,” at 787. Similarly, *IEEE 100 The Authoritative Dictionary of IEEE Standards Terms*, 7th Ed., 2000 defines the “key folding function” as “a hash function in which the original key is split into two or more parts and some portion of their sum is returned as the hash value,” at 600.

The specification of the pending application also describes one example of folding, "Folding can be achieved by performing exclusive OR (XOR) operation between the top half of the index 37' and the bottom half of the index." (Specification at Para. 25)

Accordingly, as claimed in amended claim 1, applicants provide two global predictors, the second global predictor includes "folding the second index to obtain a smaller index." As such, Applicants have preserved the history data of the larger index with the folding function.

In contrast, the Examiner has suggested the combination of Talcott with references Biles, Yeh, and McFarling, to employ a branch production using a global history register and the least significant bits of the last instruction address. Talcott therefore disregards all of the history except for a truncated portion very last instruction address. Thus, Talcott does not teach or suggest employing a folding function. As required by MPEP § 2143, "the prior art reference (or references when combined) must teach or suggest all the claim limitations." As such, and the Examiner has not established a prima facie rejection in view of Biles, Yeh, McFarling or Talcott, because none of the references teach or suggest "folding the second index to obtain a smaller index for use in indexing into the second global array," as required by Claim 1

Therefore, Applicants respectfully request entry of the amendment and allowance of amended Claim 1, amended to incorporate the recitations of previously presented claims 3 and 34, because the Examiner has not established a prima facie case of rejection under § 103.

Claims 4-17, and 33 depend on Allowable Claim 1

Claims 4, 5, and 6 are currently amended to change their dependence from previous claim 3 (which is now incorporated into claim 1), and claims 4-17, and 33 all depend from allowable claim 1 and are in condition for allowance. Therefore, Applicants respectfully request entry of the amendment and allowance of claims 4-17, and 33.

Claims 18, and 20-23 are Amended to Recite Folding

Claims 18-19, 21-24, 27, 29 and 31 were rejected under 35 U.S.C. 103(a) as being unpatentable over Biles in view of Yeh et al. (U.S. Pub. No. 2001/0047467). Applicants have amended Claim 18 to incorporate the recitations of Claim 19 and "folding the second index to obtain a smaller index for use in indexing into the second global array." Claim 19 is canceled. For the same reasons discussed above

regarding the same recitations in previous claim 34, and currently amended claim 1, “folding the second index to obtain a smaller index for use in indexing into the second global array” is not found in the prior art. Claims 20 and 21 are amended to change the dependency of these claims, previously dependent upon Claim 19 to Claim 18, which incorporates the recitations of Claim 19. Thus, Claim 18 and all claims that depend therefrom are in condition for allowance, and applicants respectfully request entry of the amendment and allowance of claims 18, 20-23.

Claims 27, and 30-32 are Amended to Recite Folding

Claims 27, 29, 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Biles in view of Yeh et al. (U.S. Pub. No. 2001/0047467). Applicants have amended Claim 27 to incorporate the recitations of Claim 29 and “folding the second index to obtain a smaller index for use in indexing into the second global array.” Claim 29 is canceled. For the same reasons discussed above regarding the same recitations in previous Claim 34, and currently amended Claim 1, “folding the second index to obtain a smaller index for use in indexing into the second global array” is not found in the prior art. Claims 30, 31, and 32 are amended to change the dependency of these claims, previously dependent upon Claim 29 to claim 27, which incorporates the recitations of claim 29. Thus, Claim 27 and all claims that depend therefrom are in condition for allowance, and applicants respectfully request entry of the amendment and allowance of claims 27, 30-32.

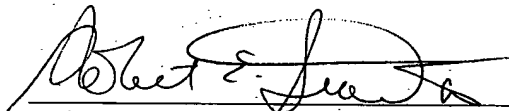
CONCLUSION

It is submitted that the application is in condition for allowance. Entry of the Amendment after Final and a Notice of Allowance in due course is solicited. The Office is hereby authorized to charge any additional fees under 37 C.F.R. §1.16, §1.17, or §1.136 or credit any overpayment to Deposit Account No. 11-0600.

Should the Examiner have any questions concerning this matter, he is invited to contact Applicants' undersigned attorney at (202) 220-4275.

Respectfully submitted,

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